INFLUENCE FUNCTIONS IN THE NUMERICAL ANALYSIS OF BENDING OF THIN ELASTIC PLATES.

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Transactions of the Canadian Society for Mechanical Engineering
Vol. 8, Issue.2, 1984

Abstract: A numerical method for the linear analysis of thin plates of arbitrary plan form and subjected to arbitrary loading and boundary conditions is presented. This method is an extension of the Wu-Altiero method where use has been made of the force influence function for an infinite plate, whereas the work contained in this paper is based on the use of the moment influence function of an infinite plate. The technique basically involves embedding the real plate into a fictitious infinite plate for which the moment influence function is known. N points are prescribed at the plate boundary at which the boundary conditions for the original problem are collocated by means of 2N fictitious moments placed around contours outside the domain of the real plate. A system of 2N linear algebraic equations in the unknown moments is obtained. The solution of the system yields the unknown moments. These may in turn be used to compute deflection, moments or shear at any point in the thin plate. Finally, the method is extended to include influence functions of both concentrated forces and concentrated moments. This is obtained by applying concentrated moments and forces simultaneously on the contours located outside the domain of the plate.